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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,021	01/23/2004	Bernhard Stegmuller	MAIKP114US	8958

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EXAMINER
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PEACE, RHONDA S

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 05/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b> 10/764,021	<b>Applicant(s)</b> STEGMULLER, BERNHARD	
	<b>Examiner</b> Rhonda S. Peace	<b>Art Unit</b> 2874	

— The MAILING DATE of this communication appears on the cover sheet with the correspondence address —

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

*application re*

- 1) ☒ Responsive to ~~communication(s)~~ filed on 1/23/2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 and 31 is/are rejected.
- 7) ☒ Claim(s) 27-30 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 1/23/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08).  
Paper No(s)/Mail Date 2/20/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 2/20/2004 was filed in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner, as indicated by the attached initialed copy of form PTO-1449.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-9, 15, and 20-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Goldsmith et al (US Patent 5479539).

Claims 23-26, and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Ramdane et al in their paper published in the Journal of Selected Topics in Quantum Electronics, Monolithic Integration of Multiple-Quantum-Well Lasers and Modulators for High-Speed Transmission.

As to claims 1-3 and 5-7 Goldsmith et al (US Patent 5479539) teaches a transceiver comprising a millimeter antenna (col 6 lines 22-25, figure 10a), electroabsorption modulator comprising a multiple quantum well layer, **322**, and laser (an optically active element), **330**, wherein the laser is optically coupled to the

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electroabsorption modulator and integrated in the same semiconductor substrate (figure 3) comprising gallium arsenide material (figure 5).

Regarding claim 4, multiple quantum well structures, such as the electroabsorption modulator of Goldsmith et al (US Patent 5479539), are, by their nature, comprised of several active layers. It is inherent that the laser (an optically active element) and electroabsorption modulator will be placed in areas that are optimized for their particular structure.

Regarding claims 8 and 9, it is inherent that the antenna is arranged on a semiconductor substrate that is connected to a circuit carrier, given the small size of the components in question. Since these antennas are of small size, the most convenient and accepted way of implementation, according to the state of the art, is to place the antenna(s) on a semiconductor substrate that has the ability to also provide an electrical signal.

As to claims 15 and 20-22, Goldsmith et al (US Patent 5479539) discloses a method for generating millimeter waves comprising converting an optical signal with an electroabsorption modulator (col 3 lines 11-25) and radiating the signals with a millimeter antenna (figure 10a). Also, the electroabsorption modulator can modulate a signal generated by a laser, both components being integrated on a semiconductor substrate (figure 3, col 3 lines 26-42). In addition, Goldsmith et al (US Patent 5479539) discloses a method of converting electrical signals from the antenna into optical signals by modulating an optical signal using an electrical signal received by the millimeter antenna using an electroabsorption modulator (col 3 lines 26-47, figure 10a).

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Turning to claims 23-26, and 31, Ramdane et al teaches an electro-optical system comprising a semiconductor substrate, a first and second active layer (located within the Multiple Quantum Well active layer), a covering layer, where an electroabsorption modulator is disposed between a laser portion and an optical amplifier portion, and the electroabsorption modulator, optical amplifier, and laser are all coupled to electrical contacts (figure 16), and a grating is positioned between the active layer and the covering layer of the laser portion (figure 4). As well, Ramdane et al shows the MQW active layer will act as an optical waveguide wherein the modulated optical signal, modulated by the electroabsorption modulator, is passed to the optical waveguide through the amplifier portion (figure 5). As before, it is inherent that the laser (an optically active element) and electroabsorption modulator will be placed in areas that are optimized for their particular structure, including the multiple layers of the MQW active layer, which itself is composed of several active layers.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldsmith et al (US Patent 5479539) as applied to claims 1-9 and 15 above, and further in view of Yngvesson et al in their paper published in Transactions

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on Microwave Theory and Techniques, The Tapered Slot Antenna- A New Integrated Element of Millimeter-Wave Applications.

Claims 12-14 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goldsmith et al (US Patent 5479539) as applied to claims 1-9 and 15 above, and further in view of Uehara et al in their paper published by Transactions on Microwave Theory and Techniques, Lens-Coupled Imaging Arrays for the Millimeter and Submillimeter-Wave Regions.

As to claims 10, 11, and 16, Yngvesson et al teaches a millimeter slotted antenna that is fed by a coplanar conductor (abstract, figure 2). It would have been obvious to one skilled in the art to couple the teachings of Goldsmith et al (US Patent 5479539) and Yngvesson et al for the purpose of construction ease. The use of the slot antenna is preferable because they provide considerably narrower beams than other integrated antennas and have high aperture efficiency and packing density as array elements.

As to claims 12-14, and 17-19, Uehara et al teaches the use of a Yagi-Uda antenna which is mounted on a hemispherically-curved silicon lens (figure 1, col 2 lines 5-13). It would have been obvious to one skilled in the art to combine the teachings of Goldsmith et al and Uehara et al for the purpose of improving radiation patterns (col 2 lines 5-6)

***Allowable Subject Matter***

Claims 27-30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The applicable prior art does not disclose or reasonably suggest an electro-optical system comprising the following: an electrical waveguide being electrically coupled to the electroabsorption modulator contacts, a millimeter or submillimeter antenna which converts millimeter or submillimeter waves into electrical signals and vice-versa, an electroabsorption modulator which converts optical signals from the waveguide into electrical signals to be sent to the electrical waveguide, where the semiconductor substrate, common to the elements described above, is oriented upside down with respect to the electrical waveguide in a flip-chip type arrangement.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Westbrook et al discloses a two-way directional telecommunications system comprising a millimeter antenna coupled to an electroabsorption modulator, where the modulator is also coupled to a laser, as well as the method of operation of such a device. Westbrook et al also shows the electroabsorption modulator having a MQW structure, and using an indium phosphide material within its substrate. Wake et al teaches a method and device by which radio

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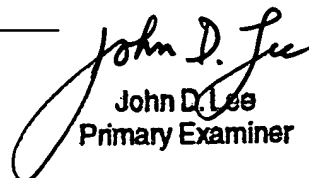
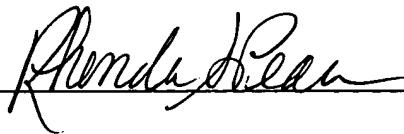
frequency modulated optical radiation is generated for use in a radio over a fiber communications system, including an electroabsorption modulator with a MQW active layer structure. Lembo et al shows an electroabsorption modulator, with a MQW structure, in use with an antenna and optical fiber structure for the purposes of converting electrical signals from the antenna into optical signals and visa versa.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda S. Peace whose telephone number is (571) 272-8580. The examiner can normally be reached on M-F (8-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272- 2344.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rhonda S. Peace  
Examiner  
AU 2874



John D. Lee  
Primary Examiner